CLAIMS:

1. An acoustic transducer arrangement comprising: an acoustic transmitter assembly including an array of transmitter elements operable to generate together a multi-frequency acoustic signal; a control unit preprogrammed to operate the acoustic transmitter assembly in accordance with a digital data stream indicative of a received signal to generate the multi-frequency acoustic signal indicative of the received data stream.

2. The acoustic transducer arrangement of Claim 1, comprising an acoustic receiver assembly operable to receive a multi-frequency acoustic signal, the control unit being preprogrammed to process data representative of the received acoustic signal to demodulate it into an output data stream and for operating an output utility to output the demodulated data, representative of the received multi-frequency acoustic signal, in a predetermined format.

3. The acoustic transducer arrangement of Claim 1 or 2, comprising at least one input/output port for inputting/outputting a data stream in the form of at least one of the following signal formats: radio-frequency signal, infra-red signal, and electrical signal, the control unit being connected to the input/output port for receiving the data stream that is to be transmitted through the transmitter assembly as an acoustic signal.

4. The acoustic transducer arrangement of any one of preceding Claims, wherein each of the transmitter elements of the transmitter assembly has a resonance frequency different from that of the other elements and is independently operated by the control unit to generate an acoustic wave component, the generated multi-frequency acoustic signal being a superposition of sinusoidal signals of the multiple different frequency components.

5. The acoustic transducer arrangement of Claim 4, wherein the resonance frequency of the transmitter element is higher than 20kHz.

6. The acoustic transducer arrangement of any one of preceding Claims, wherein each of the transmitter elements is formed by an oscillating element

characterized by a specific resonance frequency, a number of the multiple different frequency components being equal to the number of the transmitter elements in the array.

7. The acoustic transducer arrangement of any one of preceding Claims, wherein the acoustic transmitter assembly comprises at least one electrically conductive membrane accommodated in a path of an acoustic wave component generated by the transmitter element and operable to oscillate with a frequency different from that of said acoustic wave component, a number of the multiple different frequency components forming the acoustic signal being thereby higher than the number of the transmitter elements in the array.

8. The acoustic transducer arrangement of Claim 7, wherein said at least one electrically conductive membrane is accommodated in the paths of all the acoustic wave components generated by the transmitter elements.

9. The acoustic transducer arrangement of any one of Claims 2 to 8, wherein the acoustic receiver assembly comprises at least two acoustic receivers.

10. The acoustic transducer arrangement of any one of preceding Claims, wherein the control unit is configured to modulate the output data stream to be indicative of a network address of an associated communication station connectable to a communication network.

11. The acoustic transducer arrangement of any one of preceding Claims, wherein the control unit is operable to frequency modulate the output acoustic signal in accordance with a predetermined sequence of frequencies.

12. The acoustic transducer arrangement of Claim 11, wherein the frequency components generated by the transmitter elements are spaced from each other by a predetermined value.

13. The acoustic transducer arrangement of Claim 12, wherein said frequency modulation is such that a presence in the multi-frequency acoustic signal of a specific one of frequency components of said predetermined sequence of frequencies is indicative of binary "1" and absence of a specific frequency component is indicative of binary "0".

14. The acoustic transducer arrangement of any one of preceding Claims, wherein the control unit is configured to apply an amplitude modulation to the frequency components.

15. The acoustic transducer arrangement of Claim 14, wherein the amplitude modulation is based on that the amplitudes of the frequency components in the multi-frequency stream vary in a certain predefined order.

16. The acoustic transducer arrangement of Claim 14 or 15, wherein the amplitude modulation is based on that each of the amplitudes of the frequency components generated by the transmitter elements is within a predefined range.

17. The acoustic transducer arrangement of any one of Claims 14 to 16, wherein the amplitude modulation is based on a specific key defining a certain sum of the amplitudes of specific bits in the data sample.

18. The acoustic transducer arrangement of any one of Claims 14 to 17, wherein the amplitude modulation is based on a specific key defining a certain difference between the amplitudes of the adjacent frequency components in the multi-frequency stream.

19. The acoustic transducer arrangement of any one of Claims 2 to 18, wherein the demodulation of the received acoustic signal includes an error correction.

20. The acoustic transducer arrangement of Claims 14 and 19, wherein the error correction is based on checking for the amplitudes order in the received acoustic signal.

21. The acoustic transducer arrangement of Claims 14 and 19, wherein the error correction is based on checking for a certain threshold for an amplitude difference between the adjacent frequencies in the received frequency stream.

22. The acoustic transducer arrangement of Claim 19, wherein the error correction utilizes a certain key in the form of a predetermined digital stream periodicity in the received acoustic signal.

23. A communication device connectable to a communication network, the device comprising the acoustic transducer arrangement of any one of preceding Claims.

24. A communication system comprising at least two communication devices connectable to each other through at least one acoustic transducer arrangement of any one of Claims 1 to 22.

25. A method for use in data exchange between communication systems, the method comprising utilizing an acoustic transducer arrangement configured to carrying out the following:

receiving an electrical, RF or IR signal encoded with data coming from a first communication system and addressed to a second communication system;

converting the received signal into a corresponding digital data stream;

processing said digital data stream to translate it into a predetermined sequence of frequencies;

concurrently operating an array of acoustic transmitters to generate a multi-frequency acoustic signal in the form of a superposition of frequency components generated by the acoustic transmitters; and

transmitting the generated multi-frequency acoustic signal to a second acoustic transducer arrangement associated with the second communication system.

26. The method of Claim 25, comprising:

receiving an external multi-frequency acoustic signal encoded with certain data addressed to the first communication system; and

processing the received acoustic signal in accordance with data indicative of a predetermined sequence of frequencies to thereby decode the data.

27. The method of Claim 25 or 26, wherein the generated acoustic signal is transferred to the second communication system via a network formed by a plurality of the acoustic transducer arrangements communicatable with each other.

28. The method of Claim 27, wherein the data is indicative of the network address of the respective acoustic transducer arrangement.

29. The method of any one of Claims 25 to 28, wherein each of said frequencies is higher than 20kHz.

30. The method of any one of Claims 25 to 29, wherein said processing of the digital data stream comprises slicing said digital data stream into samples that are of

a predefined fixed length and generating a corresponding sequence of voltages in accordance with the predefined order of frequencies of the transmitters in the array, said sequence of voltage being used for the operation of said array of the acoustic transmitters.

31. The method of any one of Claims 25 to 30, wherein said processing of the digital data stream includes frequency modulation of the acoustic signal to be transmitted, in accordance with a predetermined sequence of frequencies.

32. The method of Claim 31, wherein the frequency components generated by the transmitter elements are spaced from each other by a predetermined value.

33. The method of Claim 32, wherein said frequency modulation is such that a presence in the multi-frequency acoustic signal of a specific one of frequency components of said predetermined sequence of frequencies is indicative of binary "1" and absence of a specific frequency component is indicative of binary "0".

34. The method of any one of Claims 25 to 33, wherein said processing of the digital data stream comprises an amplitude modulation of the data stream.

35. The method of Claim 34, wherein said amplitude modulation comprising assigning to each of the frequencies a certain amplitude in accordance with predefined amplitude ranges for said frequencies.

36. The method of Claims 34, wherein the amplitude modulation is based on that the amplitudes of the frequency components in the multi-frequency stream vary in a certain predefined order.

37. The method of Claim 34, wherein the amplitude modulation is based on that each of the amplitudes of the frequency components generated by the transmitter elements is within a predefined range.

38. The method of Claim 34, wherein the amplitude modulation is based on a specific key defining a certain sum of the amplitudes of specific bits in the data sample.

39. The method of Claim 34, wherein the amplitude modulation is based on a specific key defining a certain difference between the amplitudes of the adjacent frequency components in the multi-frequency stream.

40. The method of any one of Claims 25 to 39, wherein the decoding of the received acoustic signal includes an error correction.

41. The method of Claims 34 and 40, wherein the error correction is based on checking for the amplitudes order in the received acoustic signal.

42. The method of Claims 34 and 40, wherein the error correction is based on checking for a certain threshold for an amplitude difference between the adjacent frequencies in the received frequency stream.

43. The method of Claim 40, wherein the error correction utilizes a certain key in the form of a predetermined digital stream periodicity in the received acoustic signal.